REMARKS

§ 112 rejections

Claim 2

The Examiner rejected claim 2, as the previous version of the claim apparently was unclear how the sensor detecting the position tracking feature would detect the position of the test device in the carrier. The claim has been revised to delete the phrase in question and simply recite that the carrier "further comprises features for holding the test sample devices, and wherein the features are arranged in the carrier such that the test sample devices are in alignment with the position tracking features of the carrier." Support for the claim amendment is found in Figures 7-15 and page 21 lines 1-9. The features holding the test sample devices are the bumps and ridges shown in Figures 8 and 9 which define the slots 202 for the cards.

Claim 4

The Examiner states that the structural relationship between the elements, such as for example the motor driven block and the servomotor, is not clear in claim 4.

Applicants are claiming in claim 4 the preferred embodiment shown in Figures 29-32. As shown in Figure 29, the bearing mount (1020 in the drawings) is the structure which supports the second end of the shaft (1010 in the drawings) – the opposite end from the end from the servomotor (1006) which drives the shaft. The applicants have previously amended the limitation related to the threaded member (1005 in the drawings) to recite a threaded member "fixed with respect to said block receiving said threaded

shaft between the first and second ends thereof." Thus, the threaded member is intermediate the ends of the shaft – the bearing is at one end and the servomotor is at the other end, and the threaded block receives the shaft between the first and second ends. This is what is shown in Figure 29, 30 and 32. The structural relationship is further clarified by the recitation that "as said shaft is rotated by the servomotor within said threaded member, said block is slid along said guide [1008 in the drawings] to thereby move said block between said first and second ends of said path." This is exactly what is described in the patent specification and shown in the drawings.

The applicants respectfully submit that claim 4 adequately recites the necessary structural relationships and request withdrawal of the rejection.

The § 112 rejection of claim 21 is moot in view of the cancellation of the claim.

§ 102 Rejection

Claims 1-4 stand rejected by Karl et al., U.S. patent 5,891,396 (hereafter "Karl"). The rejection should be withdrawn because the position tracking features of claim 1 are not shown in Karl.

As recited in claim 1, there are two tracking features which cooperate to keep track of the location of the carrier within the sample testing machine – 1) optical position tracking features which are formed in the carrier (part (a) of claim 1) and 2) "at least one carrier position tracking sensor placed along said path detecting the position tracking features on said carrier as said carrier is moved along said path" (part (c) of claim 1). These features are not shown in Karl.

In particular, the Karl patent discloses the use of stepper drive motors 48 which are coupled to a collar 40 via a belt. A paddle 48 is mounted to the collar. In the system of the Karl patent, the system keeps track of the position of the collar and paddle (and thus the sample carrier "boat" 22 (Figure 6 of Karl)) by counting "steps" of the stepper motor. Stepper motors are brushless motors which can divide a full rotation of the motor into a large number of angular steps, for example, 200 steps. Thus, the motor can be turned to a precise angle. For example, in the Karl patent, a particular number of steps (motor rotation) can be converted to an amount of linear travel, e.g., count 300 steps and theoretically the sample "boat" of the Karl patent will have moved to position for diluting, count another 50 steps and the "boat" will be in position for pipetting, etc. The system thus does not rely on an optical position tracking feature on the carrier, the position of which is detected by a sensor placed along the path of the carrier. Rather, in Karl, positioning of the boat 22 is solely dependent on counting steps of the stepper motors 48 as the boat 22 is maneuvered along the four sides of the instrument.[1]

Conversely, the present invention is considered a more reliable improvement over the Karl patent in that it includes a positioning feature formed in the carrier itself and a sensor which detects the position of this feature directly. In the Karl patent, the determination of actual position of the "boat" based on counts of steps of a stepper motor is in fact dependent on many factors, all of which much be precisely calibrated. In particular the system of Karl requires a correct translation of "steps" into linear inches of travel, but this can be inaccurate due to play, expansion (stretching) or contraction of the

[1] The Examiner's statement that the operation of the stepper motors is controlled by the servo-system which includes optical interrupt detectors (at page 5 of the office action) is inaccurate. The optical interrupt detectors cited by the Examiner are used for a completely unrelated aspect of the instrument and play no role whatsoever in control of the movement of the carrier (boat and cassette combination). See the discussion on page 8, infra.

belt which is driven by the motor; moreover manufacturing tolerances or wear in the size or shape of the collar, the paddle, and the molding of the sides of the boat where the paddle engages the boat can all effect the position of the boat when the system just counts motor steps. The present invention avoids all these potential sources of error by sensing the position of the position feature of the carrier ***directly*** by means of a sensor.

Lastly, for the positioning feature of claim 1 the Examine cites to the features of Karl et al. of a distinct and totally unrelated transport system – - the transport system for moving the cards relative to the optical station for reading the wells of the cards. (see generally Figures 17-23 and col. 16 line 54 to col. 21 line 67). In the Karl et al. patent, optical interrupt apertures (112) are formed in the cards in alignment with the wells of the card. As explained at the top of col. 21 and shown in Figure 23, a detector positioned on the opposite side of the card from the light source in the card transport system detects the light through the aperture in the card, and uses such detection to control movement of the card so that transmittance and fluorescence measurements can be made across the wells of the card as the card is rapidly moved back and forth across the reading detectors (Figures 20, 21, 23, 24, 25).

However, in combining the features of the card transport system with the carrier transport system, the Examiner is mixing apples and oranges. The features of the card transport system (see generally Figures 17-23 and col. 16 line 54 to col. 21 line 67) have nothing whatsoever to do with the movement of the carrier (boat and cassette combination) or knowing where in the instrument the carrier is located. The card transport system operates on the test sample cards after they have been removed from the

carrier and loaded into the incubation station, and after the cards have been ejected out of the incubation station into the card transport system of Figure 17 of Karl et al.

Accordingly, the Examiner's analysis of Karl is incorrect and the card transport system features cited by the examiner do not in fact read on claim 1. For example, claim 1 recites:

a) a carrier holding test sample devices and having a plurality of optical position tracking features formed in said carrier;

There are no optical position tracking features in the carrier (boat and cassette) of Karl et al. The optical position tracking feature of Karl et al. is in the test sample card, not the carrier.

As another example, claim 1 recites:

c) at least one carrier position tracking sensor placed along said path detecting the position tracking features on said carrier as said carrier is moved along said path.

In Karl et al., the sensor of the card transport system (Figure 17) is not placed along the path of movement of the carrier, and does not detect any position tracking features of the carrier. Rather, the sensor is used to determine the position of the test sample card, not the carrier.

Accordingly, the anticipation rejection of claims 1-4 and 20 is clearly in error and should be withdrawn.

§ 103 Rejection

The Examiner rejected claim 5 as obvious over Karl et al. Applicants submit that the rejection should be withdrawn because Karl et al. does not disclose or suggest the position tracking and optical sensor features of claim 1, as explained above.

Moreover, Karl et al. teaches away from using replaceable wear strips in claim 5. In Karl et al., the entire base pan 24 across which the boat 22 slides is made of a single piece of low friction material (e.g., Delrin or ultra high molecular weight plastic) and one would have no occasion for replacing a section of the base pan. Claim 5 contemplates replaceable strips – i.e., only a strip of material is provided for providing a supporting surface of the carrier and the strip is replaceable. This is completely distinct and nonobvious from Karl et al.

Conclusion

Applicant submits that the rejections should all be withdrawn and the case passed to issuance. Prompt and favorable action to that end is requested.

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Date: 2/1/08 by: _____

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